What Could Go Wrong Now?

By LCdr. Paul Neuzil

Gather a bunch of aviators, and you'll hear some hair-raising sea stories. Usually they are about someone else who met an unfortunate end or who lost a few fingers, toes, or a pound of flesh. My story centers around what happened to me. It is said, "He who tells the best story speaks of himself."

Long ago and far away, I was a young instructor pilot at VT-31 in Corpus Christi, Texas. We were in the infant stages of introducing the TC-12 to the squadron. Navy and Air Force students headed to P-3s or C-130s received TC-12 training.

Most instructors flew two events (four sorties) a day to maintain student throughput, and this day was no exception. I started the day with a T-44 flight from 0600 to 1100, followed by a second event in the afternoon in the TC-12. It was a great day for flight training. The weather was a perfect spring day in the Texas Riviera.

The first event went off without a hitch, and I was confident the second would go as well. However, as I came out of the debrief, I was told I needed to do a functional-check flight (FCF) if I wanted to have an aircraft for my second event. The command duty officer had a student as my copilot, and we were to meet in maintenance control at 1300. I grabbed a quick lunch, then went to the TC-12 hangar to catch up with my copilot and to brief. After the pleasantries, we read the aircraft-discrepancy book (ADB) and got the QA brief.

During the brief, we learned the mechanics had worked on the No. 2 propeller control and adjusted the fuel-control unit. The FCF would be a piece of cake, and my copilot and I went to preflight, which went like clockwork. Twenty minutes later, we were in the run-up, completing our final checks. All aircraft systems checked good, and we taxied to the active runway for takeoff. I received clearance to work block two central, briefed the takeoff, and took off VFR to the warning area. We flew out the climb radial to our assigned block altitude of 7,000 feet. My copilot was busy reading checklists and the FCF deck, making sure we did each step of the check flight. The aircraft had performed as advertised to this point.

We leveled off and were ready to do the required engine checks. The first step was to fuel chop the engine and try to restart it, using

the windmilling-airstart procedure. I confirmed with my copilot that I had the No. 2 condition lever, then started to cut off the fuel. The engine shut down, and the propeller continued to windmill. I completed the required steps to reintroduce fuel to the engine, then placed the condition lever to the on position, but the engine did not relight.

To make matters worse, I had the classic no-fuel-flow, no-lightoff. I elected to completely shut down the engine. We feathered the propeller and discussed our options. The FCF deck called for a reattempt to light off the engine with the starter. I was certain this second try wouldn't work, because I wasn't able to get fuel to the igniters to light off the engine during the windmilling airstart. We elected to give it the ol' college try, figuring the worst thing that could happen would be another failed lightoff, and we always could refeather the engine.

We performed the procedures for a starter-assisted airstart, and, sure enough, the engine again failed to lightoff. I secured the start and completed the emergency-engine-shutdown procedure. I verified the engine switches were in the proper position while my copilot completed the checklist, which requires checking the voltmeter to make sure the remaining generator is not overworked. I checked the voltmeter, and it exceeded output requirements. I thought to myself, "This is not good."

I reverified all switches in the proper position and had the co-pilot also check their position. We began to shut down all non-essential equipment to reduce the load. I mainly was concerned with the air conditioner and the load it draws on the system, but we couldn't reduce the load. We immediately headed back to NAS Corpus Christi, declared an emergency with ATC, and hoped for a favorable outcome.

As we began our descent toward home, we again discussed the possible outcomes. We faced the real possibility we would lose the No. 1 generator, which would leave us with just battery power.

No sooner did we finish discussing this possibility than the No. 1 generator-failure light came on. A little concerned now, I turned off the generator, updated ATC, and told them of my intentions to enter a left base, for a full stop on the active runway at NAS Corpus Christi. I also advised them I probably would lose all communications because of a dwindling battery charge. They switched me to Corpus Christi tower, and I was cleared to land.

We were six miles northeast of the field at 5,000 feet when I began to configure the plane for landing. We put down the flaps, and I saw they moved very slowly. The radios were intermittent. I tried to contact the tower and update them on our situation and intentions, but, within seconds, the battery was gone—we had lost electrical power. My student copilot, a little frantic but still in control, began to read the approach and landing checklists when we were two miles from the field.

Suddenly, the copilot stopped and reminded me the gear was not down. In my haste to get the aircraft back, I had forgotten a very important step: the landing gear. Fortunately, the TC-12 has a manual-system backup for the gear. It requires a strong arm and a bit of elbow grease, but we were determined to land with the gear fully extended. As I began to pump down the gear by hand, I elected to set up the overhead-pattern entry into the active runway. This plan would give me more time to get the gear down and to set up for the landing. We got the gear down, but we couldn't confirm them down with the traditional means of landing-gear-positional indicators. Rather, we had to visually check the mainmounts, and to hope the nose gear was safely in position. We relied on blind faith and the knowledge all three landing gear were connected on the same linkage. The gear looked to be down, and that was good enough for me.

As we turned to the right downwind, I briefed the copilot to look for our clearance-to-land via the green Aldis lamp from the tower, since we had no radios. We got to the right 180 position, and we rocked our wings. I initiated the turn to final as the copilot reviewed the landing checklist. We rolled through the 90, again rocked the wings, and the copilot looked for our landing clearance. As we rolled onto final, my copilot still had not seen our landing clearance from the tower. I continued the approach because the tower was aware of our emergency, and the runway was clear with the crash trucks waiting for us. I breathed a sigh of relief when we felt the wheels contact the runway. We landed normally, turned off the active, completed the secure checklist, and exited the aircraft on the taxiway.

The crash crew met us and began to safe the aircraft. They went to the battery compartment to disconnect the battery. When they opened the compartment, my heart

skipped a beat. The nickel-cadmium battery had begun to swell. The crash crew disconnected and removed it from the aircraft.

We went to maintenance control and started to debrief what had happened. Midway through the debrief, we were notified the aircraft battery had gone into a thermal-runaway condition, which is very bad. The battery compartment on the TC-12 sits on top of the fuel tanks. The danger with a thermal-runaway battery is it can explode. If that had happened, we wouldn't have had an in-flight emergency; it would have been more like the Challenger disaster.

Later it was determined we had a failure in the starter-generator switch on the No. 2 engine. The relay had frozen in the energized position, allowing the starter to continue to run. This problem caused an excessive drain on the remaining generator and was why the battery went into a thermal-runaway condition.

What I took away from this experience was that even the most benign event can have serious outcomes in naval aviation. We never can predict what will happen to us, and we must be on top of our game all the time. All crew members contribute, no matter how junior they are. The use of ORM, coupled with good CRM, can increase your awareness of potential hazards and can give you the opportunity to change your fate, based on sound decisions from great inputs.

LCdr. Paul Neuzil flies with VP-47.